

Claims

1. Process for printing successive sheets of documents, such as securities, banknotes, checks, ID and passports, in which said sheets are transported by a chain gripper system comprising successive grippers attached to two parallel chains and a printing unit, wherein the successive sheets are printed in said printing unit while being held by the chain gripper system and wherein the chain gripper system has a chain speed  $V_c$ , the printing cylinder has a printing cylinder speed  $V_{pc}$ , wherein both speeds are synchronized such that a gripper enters said printing cylinder pit at the trailing edge of said cylinder, wherein said speeds are then relatively modified such that said gripper arrives at a leading end of said cylinder when said screen cylinder starts to deposit ink on the sheet being printed.
2. A process as claimed in claim 1, wherein the printing unit comprises a printing cylinder and a silk-screen cylinder, said printing cylinder comprising at least a cylinder pit for receiving a gripper of said chain gripper system.
3. A process as claimed in claim 2, wherein said relative modification of speed comprises an increase of the printing cylinder speed  $V_{pc}$ .
4. A process as claimed in one of claims 1 to 3, wherein the speed of the printing cylinder and of the inking cylinder is slightly higher than the chain speed  $V_c$  during the printing operation.

5. A process as claimed in one of claims 2 to 4, wherein the inking cylinder is shifted away from the printing cylinder to allow the cylinder pit to receive the gripper and the inking cylinder is shifted towards the printing cylinder to allow the printing operation.

6. A process as claimed in one of claims 1 to 5, wherein during the printing operation, the sheet is maintained against the printing cylinder by vacuum.

7. A printing machine for planar objects (1) such as sheets, securities, banknotes, checks, ID and passports and other similar documents, for carrying out the process of one of claims 1 to 6, comprising at least a printing cylinder (4), an inking cylinder (5) and a chain gripper transporting system (2,3,14,15,16) with grippers (17), wherein the printing cylinder (4) comprises at least one transversal pit (7) for receiving said chain gripper system (3) such that the inking cylinder (5) inks the planar object (1) while said object (1) is held by said chain gripper system (3), wherein said printing cylinder (4) is driven by an independent motor (6) in order to be able to vary the relative speed of the cylinder (4) and of the chain gripper transporting system (2,3,14,15,16).

8. A machine according to claim 7, wherein said inking cylinder (5) is shiftable towards and away from the printing cylinder (4) by shifting means to allow the chain gripper system (3) to enter in said pit (7) before printing.

9. A machine according to one of claims 7 or 8, further comprising an aspiration system (10,18) for applying vacuum to the printing cylinder (4).

5 10. A machine according to one of claims 7 to 9, further comprising at least one drying unit.